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1 Introduction

1.1 History

The proposed Reno Railroad Corridor is the culmination of many years of extensive analysis. For over 60 years, the City of Reno, in cooperation with various state and federal agencies, has investigated alternatives to reduce the adverse effects of railroad traffic in the downtown City of Reno area. This process included a proposal in 1936 by the United States Bureau of Public Roads to elevate the railroad. In response, the City of Reno City Engineer suggested instead that the railroad remain in its current location and that it be lowered below street level. This depressed railroad concept was intended to be less disruptive to the character of the downtown area than an elevated structure, which would create a barrier through the City of Reno. In a 1942 report, The City of Reno Chamber of Commerce subsequently endorsed the depressed trainway project. Updated reports endorsing a depressed railroad corridor were prepared in 1944, 1968, 1972, 1976, and 1980. Notwithstanding these endorsements, a combination of engineering infeasibility, prohibitive costs and a negative political climate continued to preclude construction of a depressed trainway through the City of Reno.

More recently, in 1996, approval of the Union Pacific/Southern Pacific Railroad merger precipitated renewed discussion of the railroad corridor through the central portion of the City of Reno. The Final Mitigation Plan (U.S Surface Transportation Board 1998) for the merger estimated that the railroad traffic through the corridor would grow substantially over current levels. A depressed trainway was then proposed by the City of Reno as a means to address the adverse effects of existing and anticipated railroad traffic.

1.2 Purpose of Means and Methods Analysis Report

This Means and Methods Analysis Report accompanies the construction staging deliverables of the Reno Railroad Corridor project. This report is intended to supplement the engineers' estimated construction schedule and the preliminary engineering construction staging plans. The report gives information on why the staging was sequenced in the order presented. It also provides a description of what was intended to be constructed with each construction activity described in the construction schedule.

2 Description of the Preferred Alternative (Alternative 5)

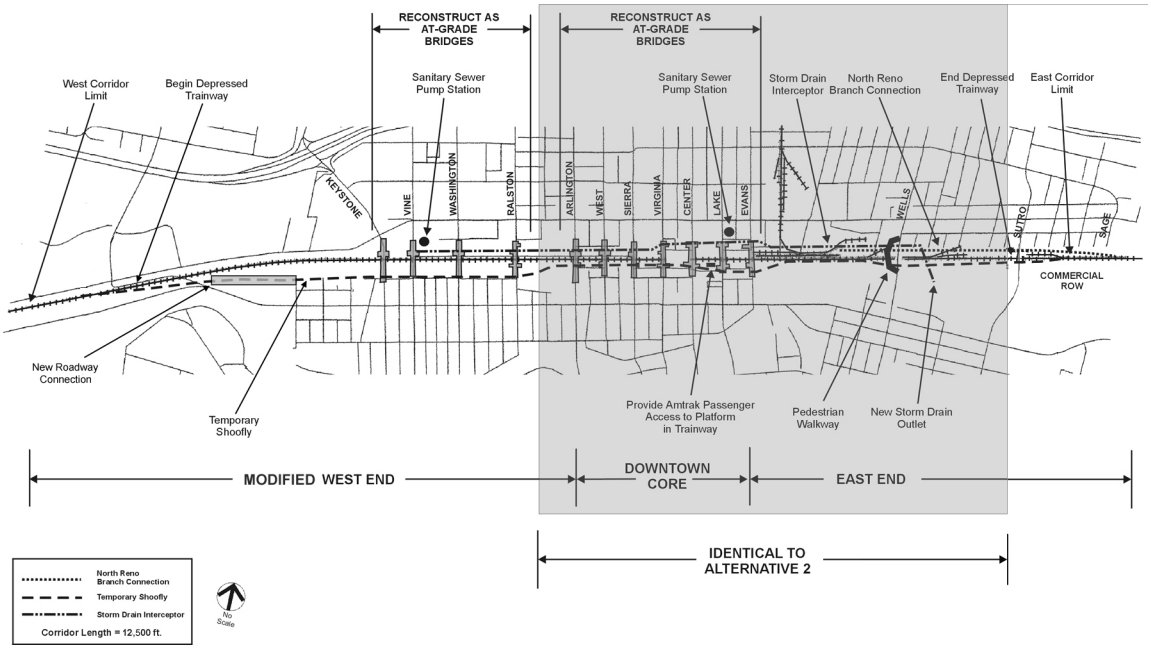
After evaluating Alternatives 2, 3 and 4 in the Draft Environmental Impact Statement (DEIS), a preferred project alternative has been identified. The Preferred Alternative is a hybrid of Alternatives 2 and 3, known as Alternative 5, identified as an approach to the project which would further reduce both project cost and environmental effects, when compared to the previous alternatives.

Alternative 5, consists of a fully grade-separated two-track main line railroad corridor through the central portion of the City of Reno, from a point approximately 250 feet west of West Second Street on the west end to approximately 50 feet west of Sutro Street on

the east end (see figure below). The corridor would become a depressed trainway descending at a 1.2 percent grade on the west and ascending at a 1.0 percent grade on the east. The length of the corridor would be an estimated 12,500 feet. The depressed trainway would be approximately 54 feet wide and 30 feet deep at its greatest depth (as measured to the proposed top of rail). The Second Street undercrossing would be eliminated. In addition, the proposed grade separation at Sutro Street would be eliminated.

This alternative is similar to Alternatives 2 and 3 in that they all strive to minimize the construction duration and construction impacts to the downtown core. In addition to these common attributes, Alternative 5 was selected for the following reasons:

- Alternative 5 would have a desirably short overall project length, which would result in a smaller amount of required excavation. The railroad profile of Alternative 5 would still be within parameters acceptable to the UPRR.
- Alternative 5 would have a reduced amount of trench excavation and wall construction required, which would translate into reduced cost. It would also have fewer property acquisitions for right of way purposes than any of the other alternatives, which would also reduce cost.
- Alternative 5 would have at-grade north-south bridges across the depressed trainway at all central Reno streets except Keystone Avenue, where an increase in grade of approximately 3 feet would be necessary.



Alternative 5, The Preferred Alternative

3 General Construction Sequence of Alternative 5

A key element of the overall Reno Railroad Corridor project is the various locations of the UPRR throughout the construction. This railroad has significant effects on adjacent properties, vehicular traffic, and construction sequencing for the entire project. Thus, the major stages and phases of construction are dependent upon the permanent or temporary location of the railroad.

In an effort to minimize impacts to the downtown corridor, a two-step railroad shoofly is to be used. The first step of this shoofly occurs only at the east and west ends of the project (as shown in the diagram on the previous page), leaving UPRR in the existing right-of-way throughout the downtown corridor.

Photo Simulation of Project Site Showing East and West End Shoofly

Once the east and west ends are constructed, the UPRR shoofly will be extended through the downtown corridor. The second step of this shoofly occurs at the east and west ends as well as the downtown corridor. This is to allow for trench construction through downtown. This two-step shoofly is to minimize the overall construction duration and impacts in the extremely sensitive downtown corridor.

Photo Simulation Depicting East and West End Shoofly,
and the Downtown Shoofly

So significant is the location and impact of this railroad that the entire project construction has been separated into two predominant areas of construction:

1) East and West End Construction and Shoofly
2) Downtown Core Construction and Shoofly

A general description of work that will occur in each of the stages and phases of work is presented below:

Stage 1

The first stage of work consists predominantly of major utility relocation and site clearing. This work can be performed prior to construction of the depressed trainway. Many of these construction activities can be performed by the utility companies themselves. Among the significant utility relocations in this stage is the relocation of a high-pressure fuel line, construction of new storm drain system, and construction of a new sanitary sewer system. The construction of the high-pressure fuel line and MCI line west of Keystone Avenue will require a temporary relocation. Once the trench retaining walls are constructed at the west end, these utilities will be permanently located just north of the new retaining wall on the north side of the trench.

Throughout Stage 1, the UPRR will continue to operate on its two existing tracks within the existing 54-foot wide UPRR right-of-way. Thus, no railroad impacts are envisioned during Stage 1. Existing streets will require temporary closures/detours to allow for construction of some utility relocations and new utility construction (storm drain box culvert). These temporary closures/detours are estimated to be less than a month.

Stage 1 construction will also include property acquisitions and demolition of several existing buildings. Furthermore, the temporary relocation of the Southern Pacific Freight House and the American Railway Express Station occur during this stage of work.

At the completion of Stage 1 construction, all major utility relocation work is to be completed and the site shall be cleared to begin construction of the depressed trainway.

Stage 2, Phase 1

Some of the Stage 2, Phase 1 work occurs concurrently with the Stage 1 work. All construction during this first phase of Stage 2 is associated with either the North Reno Branch Line, slurry walls at the east and west ends of the project, or construction of the shoofly at the east and west ends of the project.

Construction of the North Reno Branch Line must tie into the existing tracks which run in the north-south direction at Record Street. The North Reno Branch Line is parallel to the main track to Sutro Street. Even though the ultimate configuration is such that the North Reno Branch Line will tie into the main line west of Sutro, this cannot occur in the temporary condition. In the temporary condition, the North Reno Branch Line will cross Sutro Street and tie into the main line east of Sutro. This is necessary to keep the North Reno Branch Line open during Stage 2, Phase 2 construction on the main line just west of Sutro Street.

Slurry wall construction was deemed the most appropriate form of wall construction in areas of high groundwater for multiple reasons. Nolte's Wall and Invert Report[1] addresses the pros and cons of this wall type versus several others. Among the positive attributes of this wall type is that excavation of the 54-foot wide trench does not need to occur during construction of the wall. This allows the slurry wall to be constructed while railroad operation continues on the main line.

Construction of these slurry walls requires the use of a clamshell bucket that excavates the earthen material. The trench is temporarily held open by placing bentonite slurry within the trench to stabilize the walls. As material is excavated, it is to be placed in trucks to be hauled away. Typically this operation requires a width of about 45 feet for the excavator or clamshell bucket to work within. The 45 feet width also allows for trucks to pass by the excavation equipment.

Equipment Used in Typical Slurry Wall Construction

This Stage 2, Phase 1 slurry wall construction will take place approximately between Keystone Avenue and West Street on the west end of the project, and between Record Street and Evans Avenue on the east end of the project. (See drawings in the appendix for location.)

Shoofly construction at the east and west ends will include constructing shoofly subgrade, installation of new warning crossing arms at the shoofly and temporarily raising the roadway profile to meet the shoofly track.

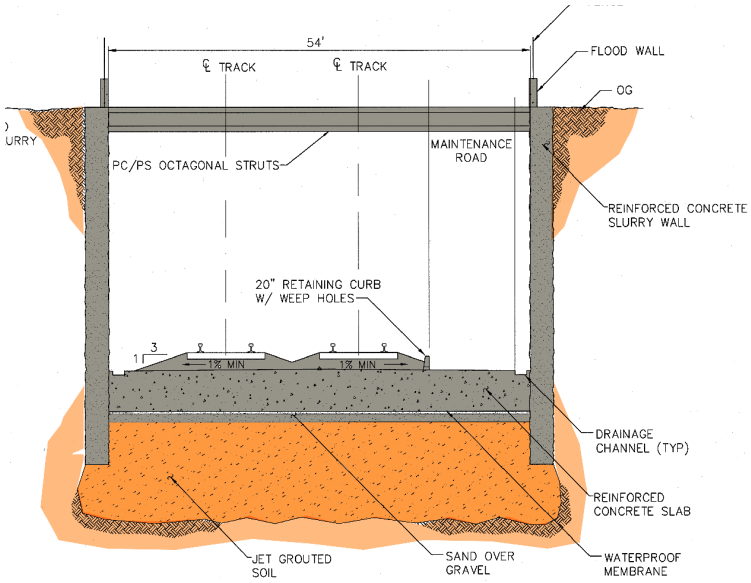
At the completion of Stage 2, Phase 1 work, the North Reno Branch Line, the east and west end railroad shooflys, and the east and west slurry walls will be in place. The milestone signifying the completion of this phase is the shift of rail traffic to the east and west end shooflys.

Stage 2, Phase 2

Phase 2 work involves major construction at the east and west ends of the project. East and west end activities include trench excavation, bottom slab construction, and construction of three bridge crossings.

Trench excavation will occur from the western most point of the project to a location between Ralston Street and North Arlington Avenue. The length of trench from the western terminous to Keystone Avenue will consist predominately of conventional concrete cantilever retaining walls. Soil nail walls will occur in a few locations within this stretch. Both the cantilever walls and the soil nail walls will be constructed only after this segment of the trench has been excavated. This is possible because the reach of trench from the western terminous to Keystone Avenue is entirely above the groundwater table.

The length of the trench from Keystone Avenue to the location between Ralston Street and North Arlington Avenue consists of slurry walls. The walls were constructed in Stage 2, Phase 1, and excavation is to occur during Stage 2, Phase 2. Excavation of these portions of the trench will occur down to an elevation where the diaphragm slurry wall can no longer cantilever above the excavated soil elevation. At that time, permanent struts will be installed at the top of the trench. (The use of tie-backs is a design option that could be installed at this time if determined during the final design process.) Once the struts are installed, excavation would continue to occur down to a point just above the groundwater elevation. Then the jet grout plug and reinforced concrete invert would be constructed.



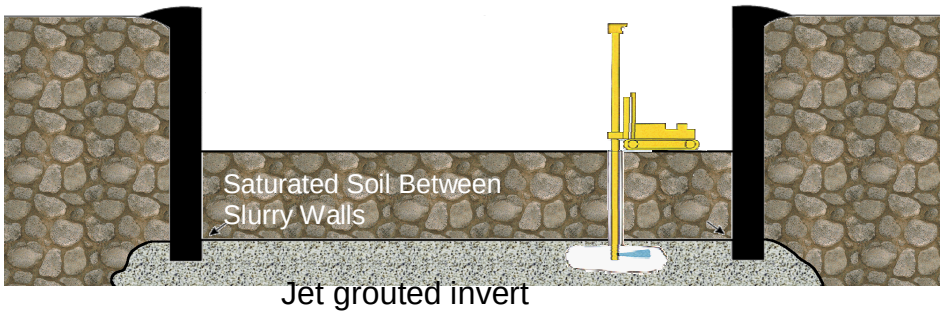
Typical Cross Section of Completed Trench
Using Struts for Lateral Support

At the east end of the project, trench excavation will occur from Sutro Street to a point approximately across from Record Street. Most of the section of the eastern end of the

project will include conventional concrete cantilever retaining walls (with soil nail walls adjacent to the Rusty Spike Substation). This can be accomplished because most of this length is above the groundwater table.

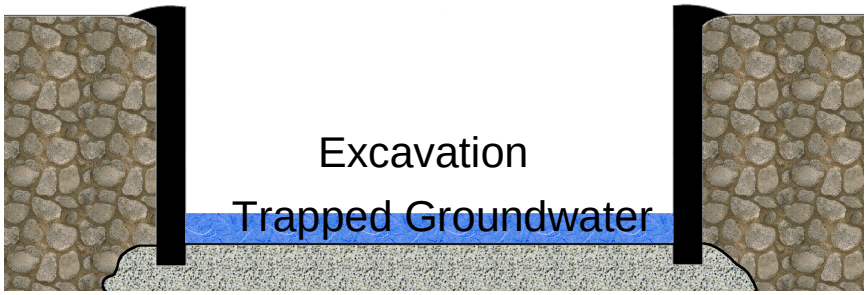
The construction of the jet grout plug and reinforced concrete invert slab is a detailed sequence that minimizes the amount of leakage through the bottom of the trench. It is envisioned that a segment on the order of 100' to 150' in length would be at a specific stage of construction whereas the adjacent segments would either be ahead of or behind the construction sequence by one step. Between each of the segments would be a jet grout cutoff wall approximately 10' in thickness, rising up to an elevation above the groundwater. These cutoff walls will help control the in-flow of groundwater and provide a means of testing the effectiveness of the invert plug . Steps to construction of the bottom invert are as follows:

- Construction of the Jet Grout Plug – Drilling equipment will work from the soil platform just above the groundwater elevation. The drill rigs will drill through the lower portion of the trench to inject cementatious material into the soil below the location of the future reinforced concrete slab. Upon completing a section 100' to 150' in length and 54' in width, the in-flow of groundwater is essentially cut off from infiltrating this section.



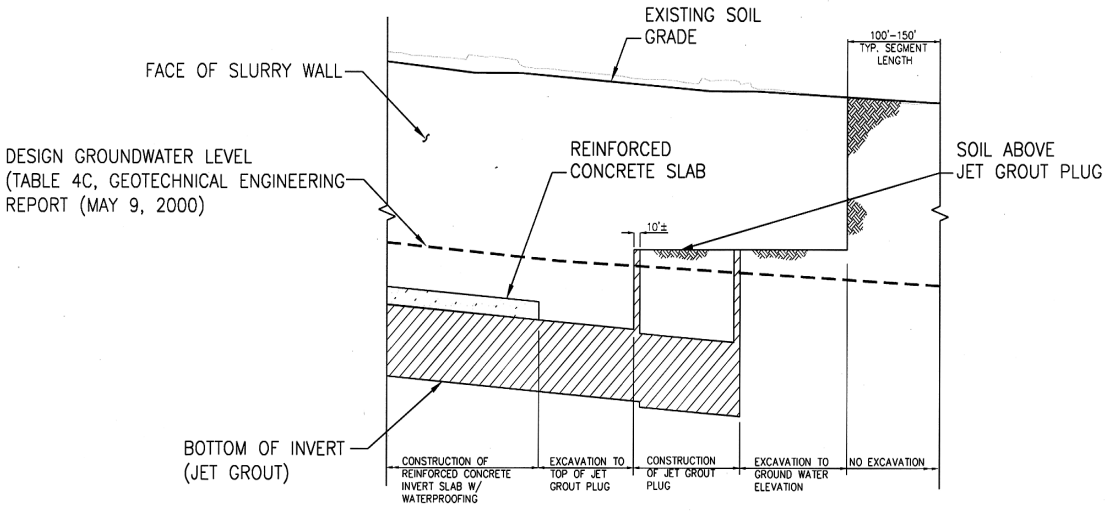
Typical Section of the Trench, Showing Construction
of the Jet Grout Plug

- Excavation to Top of Jet Grout – Once the jet grout plug is in place, excavation will occur in the 100' to 150' long saturated soil section down to the elevation of the top of the plug. This process will also require some localized pumping of groundwater trapped above the jet grout plug. Removal of this contaminated water will require treatment prior to disposal into the City sanitary sewer system. It is expected that during the excavation of this portion of soil, some temporary leakage will occur through the jet grout plug. This temporary leakage will be stopped by performing some addition grouting at the specific leakage locations. During this excavation process, a layer of gravel will be placed on top of the jet grout plug to assist with the pumping of any leaking groundwater, and to provide a leveling pad over the irregular jet grouted invert.



Typical Section of the Trench, Showing Excavation
to the Top of the Jet Grout

- Construction of the Reinforced Concrete Slab – The next segment of work involves the placement of sand over the ground layer. On top of the sand, an impervious membrane will be placed to keep groundwater from leaking through to the slab. Reinforcement and structural concrete is then placed to make up the concrete invert. It is this concrete slab, in conjunction with the impervious membrane, which serves as the ultimate barrier to groundwater. The thickness is designed such that hydrastatic head would eventually pass through the temporary jet grout invert and act upon the concrete slab.



Longitudinal Cross Section of Trench Showing Construction Sequence for
Jet Grout Invert and Reinforced Concrete Slab

Throughout construction of the trench excavation and the bottom slab, three bridges are also being constructed. During Stage 2, Phase 2, Vine Street, Washington and Ralston Street bridges are all to be built. The staging is set up so that all three streets are not

closed simultaneously. Washington Street cannot begin construction until the Ralston Street bridge over the trench is completed and open to traffic. The time duration established for each of these superstructures (resting on the slurry wall substructure) is approximately 3-4 months. This duration is based upon using precast, prestressed concrete I girders with a cast-in-place concrete deck as presented in the Nolte's Bridge Analysis Report[2].

Stage 3, Phase 1

Stage 3 work begins the construction in the downtown core. Work during Stage 3, Phase 1 occurs concurrently with the Stage 2, Phase 2 effort. This effort begins with slurry wall construction in the downtown. This activity is a continuation of slurry wall construction at the ends of the project. Once the slurry wall construction equipment is completed with the ends of the project in Stage 2, Phase 1, they will move forward with the downtown core.

Other components of work that occur during this phase are the construction of the single track shoofly through the downtown corridor and temporary noise mitigation (possibly temporary soundwalls) to be built along side the single track shoofly.

Upon completion of Stage 3, Phase 1, the trains will be shifted to the single track shoofly. This results in a shoofly being used throughout the entire length of the project.

Stage 3, Phase 2

Stage 3, Phase 2 efforts involve major construction in the downtown corridor. It essentially consists of all construction within the trench between the east and west ends as built in Stage 2, Phase 2. This phase also includes construction of overhead bridges crossing the trench at: North Arlington Avenue, West Street, Sierra Street, North Virginia Street, Center Street, Lake Street and Evans Street. At the completion of this major construction, the main line track is placed within the trench.

Unlike the east and west ends of the project, all trench construction within the downtown core is within an area that contains groundwater. This stretch of the project extends from a location between Ralston Street and North Arlington Avenue at the west end to approximately Record Street at the east end. Throughout this length, the trench walls consist of slurry walls, with the exception of underpinning at the Fitzgerald's parking garage, the Amtrak depot and one other possible building. The underpinning techniques to be used are explained in more detail in the Nolte Team's various underpinning analysis reports[3]. Most construction will occur using the same methodology as described in Stage 2, Phase 2 work. This consists of excavation to the groundwater elevation, construction of the jet grout plug, excavation to the top of the jet grout, and finally construction of the reinforced concrete slab.

During construction of the trench, the bridges will also be built. These crossings have been staged so that two adjacent major streets will not be constructed at the same time.

Furthermore, the three main crossings of North Virginia Street, Sierra Street and Center Street are staged so that two of these roadways are not closed at the same time. The construction of these crossings will consist of closing the roadway and detouring traffic to adjacent streets, as a first sequence of events. A portion of trench excavation will then occur to allow room for the precast, prestressed I girders. These girders are then installed on top of the slurry wall abutments as built during Stage 3, Phase 1. Once the I girders are in place, formwork for the cast-in-place slab are installed. The cast-in-place slab, barrier rails and sidewalks are all placed to complete the major construction of the overcrossings. A period of time from three months to five months has been allocated for each bridge. The variations in these time periods are a result of the bridge widths and quantity of utilities expected to be supported by the bridge.

Another important component of the Stage 3, Phase 2 work is the construction of the trench drainage system which ties into both the sanitary sewer and storm drain lift stations. This overall system is intended to convey storm water which falls within the trench to either the sanitary sewer line or the storm drain line. After an extended dry period, a first flush of storm water from of the trench will go into the sanitary sewer line. This will be utilized to treat any contaminated water within the trench. After a first flush event has occurred, water from within the trench will be pumped into the storm drain lift station and the storm drain box culvert.

Once the main trench, jet grout invert, and bottom slab are complete, the main track construction will take place. This activity includes placement of the railroad sub-ballast, ballast, ties and rail. Upon completion of this work, the trains will be shifted from the shoofly alignment to the final alignment.

Stage 4

With the completion of the previous stage, the railroad is ready to move into the trench. The first activity is to move the train to this final alignment. Once this has been completed, the shoofly will be removed, landscape items will be installed and the Dickerson Road extension will be built.

The construction of the Keystone Bridge is another significant activity which occurs during Stage 4. This bridge construction was postponed until Stage 4 because of its higher volume of traffic. It was felt that it would not be desirable to build this crossing at the same time as any of the three major traffic thoroughfares in the downtown core.

4 Schedule Activities

The description on the preceding pages presents information on construction staging and overall project schedule. The engineer's estimated construction schedule is included in the Appendix to assist the reader in understanding the intent of each activity. We have presented each activity below with a brief description.

Stage 1 – Utilities/Site Clearing

Activity ID	Activity	Description
RC0000	Notice to Proceed	Beginning of Construction
RC0500	Close Second Street for Utility Relocation	Closure of Second Street between Stoker Avenue and Dickerson Road
RC0600	Intersection Modifications at Stoker Avenue	Construct modifications at West Second/Stoker Avenue crossing West Fourth Street
RC1000	H.P. Fuel Line Relocation	Relocate H.P. fuel line between approximately Stoker Avenue and North Wells Avenue. A temporary relocation will be used between Stoker and Keystone.
RC1010	Fiber Optics Lines, MCI & Sprint	Relocate utilities
RC1015	Permanent Relocation of HP Fuel Line	Permanently relocate the portion of the line from Stoker to Keystone.
RC1020	Storm Drains/Diversion System	Construct storm drain interceptor from Vine Street to almost the Truckee River
RC1030	Storm Drains/Connection to River	Construct storm drain energy dissipater and outfall to the Truckee River
RC1035	Storm Drains/Box Culvert/Activate Diversion	Construct storm drain system under trench, connect to system and activate
RC1040	Sanitary Sewer/Reconstruct Mains	
RC1050	Sanitary Sewer/Pump Stations	
RC1060	Sanitary Sewer/Force Main	
RC1070	Water Lines	Reconstruct north-south water lines to avoid trench
RC1080	Electric Substation Modifications	Construct modifications to Rusty Spike substation to allow for shoofly construction.
RC1090	Electric Distribution System	Construct any necessary modifications
RC1095	Modify Rusty Spike Substation	Modifications to the substation to allow for temporary shoofly construction
RC1100	Electric 120 KV Removal/Temp Relocation	Remove 120 KV line under existing railroad mainline and install in temporary location
RC1110	Reinstall 120 KV Line Over Trench	Permanently construct support for 120 KV line over trench.
RC1120	H.P. Gas Lines	Modify utility location as necessary
RC1130	Low Pressure Gas Lines	Modify utility location as necessary
RC1140	Telephone	Modify utility location as necessary
RC1150	TCI/Cable	Modify utility location as necessary
RC1155	Demo of Miscellaneous Buildings	Demolition of existing buildings to construct temporary shoofly or permanent trench
RC1470	Underpin Hilton Garage	Underpinning of existing garage to allow the structure to remain
RC1490	Underpin Amtrak Building	Underpinning of existing building to allow the structure to remain
RC1500	Temporarily Relocate Men's Club/Freight House	Temporarily relocate the two buildings south of the shoofly
RC1510	Permanently Relocate Men's Club/Freight House	Permanently move the two buildings back to initial location after trench construction
RC1520	Demo Walls Wells Avenue UP/Morill Closure	Demo lower Wells Avenue bridge and close Morill crossing of UPRR
RC1530	Install Signalization at Shoofly for Stage 2	Install crossing warning system for Stage 2 shoofly.
RC1540	R.O.W. Acquisition/T.C.E.	City acquires property for right-of-way and temporary easements.
RC1550	Order Railroad Signals & Long Lead Items	Items requiring extensive delivery periods as ordered.
RC1990	Stage 1 Complete	

Stage 2 – East & West End Construction & Shoofly

Activity ID	Activity	Description
RC2000	STAGE 2, PHASE 1 WORK	
RC2005	Wall Construction at Shoofly	Railroad shoofly is slightly higher than existing grade which may require temporary walls
RC2010	Road Grade Adjustments at Shooflies	Existing street crossings are to be adjusted to meet the shoofly grade
RC2020	Shoofly Subgrade	Construct subgrade for shoofly
RC2030	Install Signalization at Shoofly for Stage 3	Install crossing warning system for Stage 3 shoofly
RC2040	Shoofly Rail/Activate Shoofly/UPRR Approval	Activate east and west shoofly
RC2045	STAGE 2, PHASE 2 WORK	
RC2050	Demo East & West Main Line Track	Remove main line of track from western terminous to North Arlington Avenue and Record Street to eastern terminous
RC2055	Demo Second Street Structures	Remove the existing Second Street Bridge
RC2060	Conventional Wall Const. At East & West Ends	Construct concrete cantilever retaining walls concurrently with trench excavation
RC2070	East & West End Trench Excavation	Mass excavation of trench at the east and west ends of the project
RC2080	Bottom Slab Construction	Construction of bottom slab only as necessary in locations where design high groundwater levels will be above the bottom slab
RC2085	Install Bailey Bridge at Keystone	Install temporary Bailey Bridges to allow for trench construction. Final structure to be built in Stage 4.
RC2090	Vine Street Bridge	Construction of the Vine Street superstructure on the slurry wall abutments
RC2100	Washington Street Bridge	Construction of the Washington Street superstructure on the slurry wall abutments
RC2120	Ralston Street Bridge	Construction of the Ralston Street superstructure on the slurry wall abutments
RC2140	Misc. Temp. Utility Structures Crossing Track	Construction of any miscellaneous bridges across the trench to support utility crossings
RC2150	Trench Drainage System	Construction of the drainage systems (ditches) on north and south side, within trench
RC2155	North Reno Branch Subgrade	Subgrade for North Reno Branch line
RC2160	North Reno Branch Line	Construction of the North Reno Branch line including temporary crossing at Sutro
RC2165	Activate North Reno Branch Line	Activate North Reno Branch line
RC2170	Slurry Wall Construction for Ends	Construction of slurry walls at the west end of the project from Keystone Avenue to West Street.
RC2180	Utility Placement within Bridges	Placement of utilities within Vine, Washington, Ralston or misc. bridges
RC2990	Stage 2 Complete	

Stage 3 - Downtown Core Construction & Shoofly

Activity ID	Activity	Description
RC3000	STAGE 3, PHASE 1 WORK	
RC3002	Wall Construction (Slurry Wall Next to Track)	Upon completion of slurry walls at the project ends, continue slurry wall construction in the downtown corridor.
RC3005	Road Grade Adjustments at Shooflies	Existing street crossings are to be adjusted to meet the shoofly grade
RC3007	Temporary Noise Mitigation	Construction of temporary noise mitigation (soundwalls are anticipated) adjacent to shoofly tracks in the downtown corridor
RC3010	Shoofly Subgrade/Signals/Rail	Construct shoofly through downtown corridor
RC3015	STAGE 3, PHASE 2 WORK	
RC3020	Shift Trains to Single Track Shoofly/UPRR Approval	Shift trains so that entire shoofly length from east end of project to west end of project is in use
RC3025	Arlington Street Bridge	Construction of the Arlington Street superstructure on the slurry wall abutments
RC3030	West Street Bridge	Construction of the West Street superstructure on the slurry wall abutments
RC3040	Sierra Street Bridge	Construction of the Sierra Street superstructure on the slurry wall abutments
RC3050	Virginia Street Bridge	Construction of the Virginia Street superstructure on the slurry wall abutments
RC3060	Center Street Bridge	Construction of the Center Street superstructure on the slurry wall abutments
RC3070	Lake Street Bridge	Construction of the Lake Street superstructure on the slurry wall abutments
RC3080	Evans Street Bridge	Construction of the Evans Street superstructure on the slurry wall abutments
RC3090	Bottom Slab-Jet Grouting	Construction of jet grouting as temporary invert to cut off groundwater
RC3100	Trench Drainage System	Construction of the drainage systems (ditches) on north and south side, within trench
RC3110	Storm Drains Pump Station/Separator	Construction of the storm drain pump station, wet well, and connection to trench S.D. system
RC3120	Main Line Track Construction	Construct main line track within trench throughout project length
RC3130	Amtrak Station	Construct underpinning of Amtrak station and construct new Amtrak station addition
RC3140	Trench Excavation	Mass excavation of trench in downtown corridor
RC3150	Bottom Structural Slab	Construction of reinforced concrete bottom slab
RC3160	UPRR Utilities in Trench	Placement of UPRR utilities that are parallel to the tracks within the trench
RC3165	Wells Avenue Pedestrian Bridge/Wells & Morrill Cul-de-Sac	Construct pedestrian bridge crossing the trench west of Wells Avenue
RC3170	Utilities Crossing Trench/Park Street/Etc.	Construction of any misc. bridges across the trench to support utility crossings
RC3180	Utility Placement within Bridges	Placement of utilities within Arlington, West, Sierra, Virginia, Center, Lake, Evans, or on misc. bridges
RC3990	Stage 3 Complete	

Stage 4 – Main Track & Shoofly Removal

Activity ID	Activity	Description
RC4000	STAGE 4 WORK	
RC4005	Activate UPRR Control System	Activate control system within the trench
RC4008	Train to Final Alignment/UPRR Approval	Move trains to final alignment within the trench
RC4010	Permanent Keystone Bridge/Keystone Utility Crossing s	Construct the Keystone Bridge superstructure on the slurry wall abutments
RC4040	Streetscape	Install architectural streetscape elements
RC4050	Landscape	Install landscaping
RC4080	Demo Shoofly	Remove entire project shoofly
RC4082	Reconstruct Rusty Spike Substation	
RC4085	Dickerson Road Extension	Construct Dickerson Road extension in location of west shoofly
RC4090	Return Streets (includes Sutro) to Original Grade	Reconstruct all street crossings at shoofly so streets are back to the original grade
RC4990	Clean-up/Punchlists	Complete final punchlist items of work
RC4100	Project Complete	

5 Bibliography

1. Nolte Associates, Inc. Wall and Invert Report, 2000
2. Nolte Associates, Inc. Bridge Analysis Report, 2000
3. Nolte Associates, Inc. Underpinning Analysis Report of the Fitzgerald's Parking Garage, 2000; Underpinning Analysis Report of the Rainbow Pedestrian Bridge, 2000; and Kleinfelder, Inc. Underpinning Analysis Report of the SPRR Passenger Depot, 2000

6 Appendices